

What is claimed is:

- 1                    1.        A method for generating a set of random numbers with statistics  
2 represented by a cumulative density function, comprising:  
3                    generating a set of uniformly spaced samples between an upper limit  
4 and a lower limit;  
5                    mapping each one of said set of uniformly spaced samples to a  
6 corresponding value on a cumulative density function curve; and  
7                    scrambling said set of uniformly spaced samples.
- 1                    2.        The method of claim 1, wherein said set of uniformly spaced  
2 samples are ordered in descending fashion.
- 1                    3.        The method of claim 2, wherein said set of uniformly spaced  
2 samples have an upper limit of 1 and a lower limit of 0.
- 1                    4.        The method of claim 2, wherein said set of uniformly spaced  
2 samples have an upper limit of 100% and a lower limit of 0%.
- 1                    5.        The method of claim 2, wherein said step of mapping said  
2 corresponding value for each of said set of uniformly spaced samples includes looking  
3 up said corresponding value, which is stored in ascending order in a look-up table.
- 1                    6.        The method of claim 5, wherein said step of looking up  
2 proceeds without the need for any pre-sorting.

7. The method of claim 1, further comprising:

1                   companding said uniformly spaced samples in order to increase the  
2 representation of low-probability samples.

1                   8. The method of claim 7, wherein a percentage of events  
2 occurring in said low-probability area is determined as compared to a high-probability  
3 area.

1                   9. The method of claim 8, wherein based on the relative  
2 percentages between said low-probability area and said high probability area, said  
3 samples in said low-probability area are increased by a companding factor, while said  
4 samples in said high-probability area are decreased by said companding factor.

1                   10. The method of claim 9, wherein a probability of said high-  
2 probability area is divided by said companding factor.

1                   11. A method of random number generation with a desired  
2 cumulative density function, comprising:

3                   generating a set of discrete samples between an upper limit and a lower  
4 limit;

5                   uniformly stepping said set of discrete samples in descending order  
6 between said upper limit and said lower limit; and

7                   mapping said set of random numbers to a set of values stored in  
8 ascending order and having a specified probability density function.

1                   12. The method of claim 11, further comprising:

2                   scrambling said set of discrete samples between said upper limit and  
3 said lower limit.

1                   13.     The method of claim 11, wherein said upper limit is 1 and said  
2 lower limit is 0.

1                   14.     The method of claim 11, wherein said upper limit is 100% and  
2 said lower limit is 0%.

1                   15.     The method of claim 11, further comprising:  
2                   companding said set of discrete samples to provide a more accurate  
3 representation of low-probability samples.

1                   16.     The method of claim 15, wherein said step of companding  
2 includes, compressing the number of low-probability samples using larger stepping  
3 intervals while expanding the number of high-probability samples using smaller  
4 stepping intervals.

1                   17.     A random number generation system, comprising:  
2                   a first component for generating uniformly-spaced numbers,  
3 independent of a total number of samples;  
4                   a second component for mapping said generated random numbers into  
5 a desired distribution through table lookup and scrambling; and  
6                   a third component for reducing said total number of samples needed to  
7 achieve a given statistical accuracy.

1                   18.     The system of claim 17, wherein said generated random  
2 numbers are uniformly spaced between an upper limit of 1 or 100% and a lower limit  
3 of 0 or 0%.

1                    19.    The system of claim 17, wherein said third component  
2    compresses the number of low probability samples while expanding the number of  
3    high-probability samples.

1                    20.    The system of claim 17, wherein said generated random  
2    numbers are ordered in descending fashion.